

Claims

1. Apparatus for cooling a magnetron, comprising:
  - a target assembly;
  - a cooling cavity having an outlet port disposed therein;
  - a magnetron disposed in the cooling cavity in a spaced-apart relation to the target assembly;
  - a stationary conduit;
  - a rotary union coupled to the stationary conduit; and
  - a hollow drive shaft coupled at a first end to the stationary conduit by the rotary union and having a second end coupled to the magnetron, wherein a flowpath is defined extending co-axially from the second end of the hollow drive shaft to a portion of a target assembly.
2. The processing chamber of claim 1 further comprising a seal interfacing with the hollow drive shaft proximate the second end.
3. The processing chamber of claim 2 further comprising a flange coupled to the cooling cavity and having the hollow drive shaft disposed therethrough, the seal disposed between the hollow drive shaft and the flange.
4. The processing chamber of claim 3 further comprising a bearing assembly coupled between the flange and the hollow drive shaft.
5. The processing chamber of claim 4, wherein the seal prevents fluid from passing from the cooling cavity to the bearing assembly along an exterior of the hollow drive shaft.
6. The processing chamber of claim 2, wherein the hollow drive shaft delivers coolant about a rotational axis of the magnetron.
7. The processing chamber of claim 6, wherein the hollow drive shaft delivers coolant about a rotational axis of the magnetron to a central area of a sputtering target assembly.

8. The processing chamber of claim 2, wherein the hollow drive shaft delivers coolant about a rotational axis of the magnetron to a central area of a sputtering target assembly and to a region of the magnetron about the rotational axis of the magnetron.
9. The processing chamber of claim 1 further comprising:
  - a bearing assembly engaged with the hollow drive shaft; and
  - a seal for isolating the bearing assembly from the cooling cavity.
10. The processing chamber of claim 9, wherein the seal engages the exterior of the hollow drive shaft proximate the cooling cavity.
11. The processing chamber of claim 9 further comprising a motor assembly for imparting rotational motion to the magnetron.
12. An apparatus for cooling a magnetron, comprising:
  - a chamber;
  - a substrate support member disposed within the chamber;
  - a stationary conduit;
  - a hollow drive shaft rotatably coupled to the stationary conduit and having at least a portion of a flowpath defined therein, the flowpath extending co-axially from the hollow drive shaft to a portion of a target assembly;
  - a magnetron coupled to the hollow drive shaft and maintained in a spaced-apart relation to the target assembly;
  - a cooling cavity surrounding the magnetron and having an outlet disposed therein, the flowpath extending from the center portion between the magnetron and target assembly to the outlet; and
  - a bearing assembly engaged with the hollow drive shaft; and
  - a seal for isolating the bearing assembly from the cooling cavity.
13. The processing chamber of claim 12, wherein the seal engages the exterior of the hollow drive shaft proximate the cooling cavity.

14. The processing chamber of claim 13, wherein the processing chamber comprises a physical vapor deposition chamber.
15. The processing chamber of claim 12 further comprising a motor assembly interfaced with the bearing assembly and coupled to the hollow drive shaft for imparting rotational motion to the magnetron.
16. Apparatus for cooling a magnetron, comprising:
  - a stationary conduit;
  - a rotary union coupled to the stationary conduit;
  - a flange for mounting to a cooling cavity housing a magnetron;
  - a hollow drive shaft coupled at a first end to the stationary conduit by the rotary union and having a second end extending through the flange for coupling to the magnetron;
  - a bearing assembly engaged with the hollow drive shaft to facilitate rotation of the shaft relative the mounting flange; and
  - a seal disposed between the hollow drive shaft and the flange.
17. The processing chamber of claim 16, wherein the seal engages the exterior of the hollow drive shaft.
18. The processing chamber of claim 17 further comprising a motor assembly interfaced with the bearing assembly and coupled to the hollow drive shaft for imparting rotational motion to the shaft.
19. The processing chamber of claim 18, wherein the motor assembly further comprises:
  - a cylindrical section engaging an exterior portion of the bearing assembly and adapted to engage a drive belt; and
  - a top section coupling the cylindrical section to the hollow drive shaft.
20. The processing chamber of claim 16, wherein a flowpath is defined extending co-axially from the second end of the hollow drive shaft.